


IDAHO DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENTAL QUALITY

Explanation of Significant Differences

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Explanation of Significant Differences from the Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites, Final Remedial Action

Operable Unit 1-07B
Waste Area Group 1

Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

Explanation of Significant Differences from the Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites, Final Remedial Action

1. INTRODUCTION

This document presents an Explanation of Significant Differences (ESD) from the Record of Decision (ROD) for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites, Final Remedial Action, signed by the United States Department of Energy (DOE), the United States Environmental Protection Agency (EPA), and the Idaho Department of Health and Welfare (IDHW) in August 1995. The ROD was signed pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the December 1991 Federal Facility Agreement and Consent Order (FFA/CO) entered into by DOE, EPA, and IDHW.

Site Name and Location:

Technical Support Facility Injection Well (TSF-05) and
Surrounding Groundwater Contamination (TSF-23,) Operable Unit (OU) 1-07B
Test Area North (TAN) Miscellaneous No Action Sites OUs 1-01, 1-02, 1-06, and 1-09
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The lead agency for remedial action at OU 1-07B is the United States Department of Energy Idaho Operations Office (DOE-ID). The EPA and the IDHW both concur with, and agree with the need for, this significant change to the selected remedy. The three agencies participated jointly in the review of new information and in the decisionmaking that led to the preparation of this ESD.

This ESD has been prepared in accordance with Section 117(c) of CERCLA and 40 CFR 300.435(c)(2)(i) to explain the needed modifications to the selected remedy identified in the ROD.

This ESD and other relevant documents will become part of the Administrative Record file pursuant to Section 300.825(a)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Copies of this ESD and the Administrative Record are available to the public in the following regional INEEL Information Repositories:

DOE Public Reading Room
INEEL Technical Library
1176 Science Center Drive
Idaho Falls, Idaho

University of Idaho Library
U of I Campus
Moscow, Idaho

Shoshone-Bannock Library
HRDC Building
Bannock & Pima Streets
Fort Hall, Idaho

INEEL Boise Office
805 W. Idaho St.
Suite 301
Boise, Idaho

This ESD and the Administrative Record are also available on the Internet at:

http://ar.inel.gov/home.html

2. SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

The Idaho National Engineering and Environmental Laboratory (INEEL) is a 2,305 km^2 (890 mi^2) federal facility operated by the DOE and is located on the northern edge of the Eastern Snake River Plain. The Test Area North (TAN) complex is located approximately 80 km (50 mi) northwest of Idaho Falls in the northern portion of the INEEL and extends over an area of approximately 30 km^2 (12 mi^2) (Figure 1).

The principal source of groundwater contamination at TAN is the TSF-05 Injection Well located in the southwest corner of the Technical Support Facility (TSF). The TSF-05 Injection Well was used from about 1953 to 1972 to dispose of TAN liquid wastes into the fractured basalt of the Snake River Plain Aquifer. These wastes included organic, inorganic, and low-level radioactive wastewaters added to industrial and sanitary wastewater. Activities generating these wastes included efforts to develop a nuclear-powered aircraft and tests simulating accidents involving the loss of coolant from nuclear reactors.

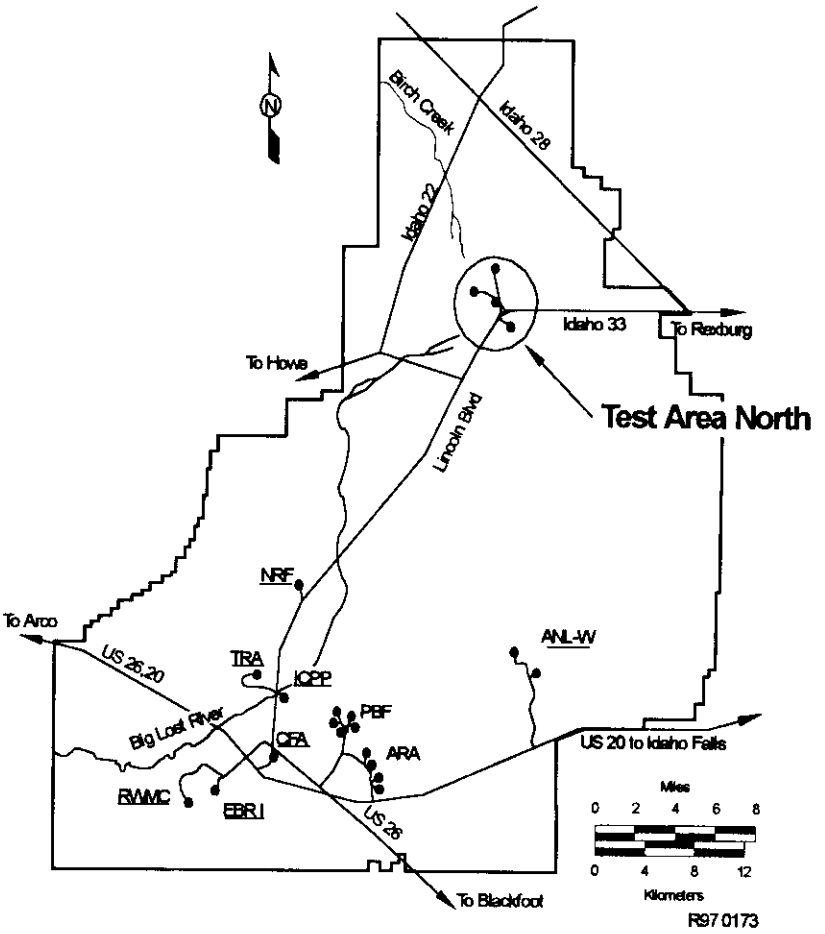


Figure 1. Test Area North at the Idaho National Engineering and Environmental Laboratory.

The primary risk driving the remediation at TAN is the ingestion of groundwater contaminated with trichloroethene (TCE). Risk assessment results were presented in the remedial investigation/feasibility study (RI/FS) and were subsequently summarized in the ROD. The decision to remediate the TSF-05 Injection Well and surrounding contaminated groundwater was presented to the public in the April 1994 Proposed Plan. Following review and response to public comments, the preferred alternative was presented in the ROD. The selected remedy was identified as Alternative 4: "25 Micrograms per Liter Trichloroethene Groundwater Contamination Plume Extraction; Hot Spot Containment and/or Removal With Aboveground Treatment."

The OU 1-07B ROD, which was signed in August 1995, establishes that the selected remedy will be conducted in three phases: Phase A - Transition of OU 1-07A Interim Action to OU 1-07B Final Remedial Action; Phase B - Hot Spot Containment and/or Removal with Treatability Studies; and Phase C - Dissolved Phase Groundwater Treatment with Continuation of Hot Spot Containment and/or Removal.

The ROD defines Phase A as providing for the transition into OU 1-07B activities through the continuation of OU 1-07A surge and stress pumping of the TSF-05 Injection Well and operation of the interim action Groundwater Treatment Facility (GWTF) to remove secondary source material, pump and treat contaminated groundwater, and collect data on aquifer parameters. The Phase A transition period, which also included testing of radionuclide removal technologies, has been completed and has provided for the end of the OU 1-07A Interim Action.

Phase B Hot Spot containment and/or removal is described as an enhancement of the OU 1-07A Interim Action and provides for continuation of GWTF pump and treat operations and TSF-05 Injection Well surge and stress activities. Phase B Hot Spot containment is defined as implementing groundwater extraction in the hot spot area at a rate sufficient to create hydraulic containment of TCE and other contaminants within the hot spot (greater than 5,000 µg/L TCE plume).

Phase B is further defined to include two-stage treatability studies to evaluate five innovative technologies relative to the selected remedy. The treatability studies are to be performed with first stage bench-scale evaluations followed by second stage pilot-scale testing. The ROD identifies a time frame of 3 years for performing the studies and submitting a Treatability Study Report to provide the results of the evaluations to determine whether any technology would be more effective than the selected pump and treat remedy.

Finally, Phase B is also defined to include groundwater monitoring to track the greater than 5 µg/L TCE plume, document TCE concentrations over time, provide information on the attenuation rate of the plume, and evaluate attainment of remedial action objectives.

The ROD defines Phase C as capture and treatment of the 25 to 5,000 µg/L TCE portion of the plume to enhance natural attenuation in the less than 25 µg/L plume and continuation of the hydraulic containment and/or removal of the hot spot and groundwater monitoring that were initiated during Phase B. Phase C is set to begin after the completion of Phase B treatability studies, approximately 3 years after signature of the ROD, and continue through year 2025. Phase C follows completion of Phase B treatability studies and includes the continuation of groundwater monitoring also initiated in Phase B. If, as a result of the Phase B treatability studies, an innovative technology is found to be more effective than the continued long-term implementation of Phase C, the agencies will modify the ROD as appropriate and begin implementation of the alternate remedy.

Institutional controls are also provided for in the OU 1-07B ROD. These controls will be established and maintained until maximum contaminant levels are achieved.

3. DESCRIPTION OF SIGNIFICANT DIFFERENCES

During implementation of Phases A and B as described in the ROD, new information was generated from groundwater monitoring, hydrogeologic tests, conceptual model development, treatability study initial evaluations, design analysis, radionuclide removal testing, and GWTF operations. Based on this new information, the Agencies have identified four areas of the selected remedy that require changes in order to most effectively continue with the remediation effort and meet the remedial action objectives as described in the ROD. The four areas are:

1. Operation of existing GWTF for hot spot containment and/or removal

2. Plume area definition, dissolved phase implementation, and natural attenuation

3. Treatability study approach and schedule

4. Waste management requirements and area of contamination definition.

Identification of the "new information" and discussion of the effect of the new information are presented in the following sections for each of the four areas. Following the new information in each section are the resulting "changes" to the selected remedy as defined in the ROD.

3.1 Operation of Existing GWTF for Hot Spot Containment and/or Removal

This section provides the new information and changes associated with operation of the existing GWTF for hot spot containment and/or removal.

3.1.1 New Information

The existing GWTF has been used to implement Phase A and B surge and stress of the TSF-05 Injection Well and extraction and treatment of groundwater for hot spot hydraulic containment. However, the results of design analysis, radionuclide removal testing, modeling, and hydrogeologic testing have provided the following significant information:

- Volatile Organic Compound (VOC) Treatment - Design analysis and operating experience indicate that the design of the GWTF has inherent limitations that preclude the facility from meeting or being modified to meet the requirements for treating groundwater to below maximum contaminant levels (MCLs) and to achieve the long-term remedial action objectives. For VOCs, the GWTF provides significant reduction in VOC concentration but falls short of meeting MCLs for TCE.

- Radionuclide Treatment - Radionuclide removal testing has shown that radionuclide removal technology is cost-prohibitive as a treatment for groundwater.

- Air Pollution Controls - The GWTF design includes carbon adsorption for removal of VOCs from the air stripper air stream. When pumping from downgradient wells other than TSF-05, groundwater influent VOC concentrations to the GWTF have fallen below the level where use of air pollution control equipment is necessary to meet air discharge requirements.

- Hydraulic Containment - Hydrogeologic testing indicates that the extraction and reinjection system using the GWTF may not be providing sufficient capture to achieve hydraulic containment of TCE and other contaminants.

- Hot Spot Treatability Studies - Treatability study initial evaluations of the five innovative technologies showed that metal enhanced reductive dechlorination would not be cost-effective for enhanced treatment of the hot spot and that grouting should be deferred pending results of evaluation of the remaining three technologies. Treatability study initial evaluations also suggested that both in situ bioremediation and in situ chemical oxidation have the potential for being more effective than the default pump and treat technology for restoration of the hot spot.

- Hydraulic Containment During Treatability Studies - Initial evaluations for in situ bioremediation and in situ chemical oxidation indicate implementation of one or both may be sufficient to provide containment of the hot spot such that operation of the GWTF may be reduced or discontinued. The planning also indicates that operation of the GWTF and extraction reinjection system may need to be modified or discontinued while treatability study field evaluation activities are in progress.

- Reinjection Location - Initial evaluations for in situ bioremediation and in situ chemical oxidation indicate the optimal operation of the treatability study field evaluation recirculation systems may require reinjection at a location other than upgradient and within the hydraulic capture zone.

- Hot Spot Containment Implementation - An underlying assumption of the selected remedy in the ROD was that hot spot containment and/or removal would be in place within the 3-year Phase B period. The results of hydrogeologic testing and further groundwater modeling indicate that the critical period of time for implementing hot spot containment and/or removal may be greater than the 3 year time frame assumed in the ROD.

3.1.2 Changes

Based on the new information identified above, the Agencies have determined that the following changes to the selected remedy will be implemented for GWTF operations and hot spot containment and/or removal. The remedy, with these changes, remains equally protective of human health and the environment to the original remedy in the ROD.

- VOC Treatment - Treated water from the existing GWTF, which may be above MCLs for VOCs, will be reinjected. The reinjected water, although above MCLs, will always be below the VOC concentration in the receiving groundwater at the reinjection point.

- Radionuclide Treatment - A radionuclide discharge standard will not be established or applied for groundwater treatment through the GWTF. During normal pump and treat operations, the GWTF ion exchange columns will be placed offline and no radionuclide treatment will occur. During treatment of groundwater from surge and stress of TSF-05, the GWTF ion exchange columns will be placed online to provide single pass radionuclide treatment.

- Air Pollution Controls - Based on existing influent VOC concentrations, the carbon adsorption air pollution control equipment in the GWTF will not be used except when necessary to meet air discharge standards.

- Hydraulic Containment - During the treatability study period, the extraction, aboveground treatment through GWTF, and reinjection will provide hydraulic containment of TCE and other VOC contaminants to the extent practicable based on the limits imposed by the GWTF VOC treatment system and the operational requirements imposed by treatability study field evaluations.

- Hot Spot Treatability Studies - In situ bioremediation and in situ chemical oxidation treatability studies will continue in the hot spot as potential alternatives to pump and treat for hot spot restoration. In the event that both technologies are shown to be less effective than the selected pump and treat remedy, grouting may be considered as a component of the final remedy.

- Hydraulic Containment During Treatability Studies - Implementation of in situ bioremediation and/or in situ chemical oxidation may be sufficient to provide containment of the hot spot such that operation of the GWTF may be reduced or discontinued.

- Reinjection Location - During surge and stress of TSF-05 Injection Well, treated groundwater from the GWTF will be reinjected within the extraction well capture zone. During other extraction and treatment situations, treated groundwater from the GWTF may be reinjected outside of the extraction well capture zone, but within the area between the hot spot and a location approximately 2,000 feet downgradient of the TSF-05 Injection Well. Reinjected water will always be below the contaminant concentration in the receiving groundwater at the reinjection point, unless agency concurrence is reached to do otherwise under site-specific conditions.

- Hot Spot Containment Implementation - The evaluation of treatability study results and final decision on the remedy for hot spot containment and/or removal will occur approximately 5 years after the ROD signature date. If treatability studies demonstrate that in situ bioremediation and in situ chemical oxidation are less effective than the pump and treat remedy, a new pump and treat system will be designed and operated for hot spot containment to treat groundwater to below MCLs for VOCs and to meet remedial action objectives. Based on the results of the Phase A radionuclide removal testing, a radionuclide discharge standard would not be established or applied for a new pump and treat system.

3.2 Plume Area Definition, Natural Attenuation, and Dissolved Phase Implementation

This section provides new information and changes associated with plume area definition, natural attenuation, and dissolved phase implementation.

3.2.1 New Information

The ROD defines the TSF-05 Hot Spot as including the secondary source and highly contaminated groundwater with TCE concentrations greater than 5,000 µg/L, and defines the dissolved phase as the portion of the plume with TCE concentrations from 25 to 5,000 µg/L. The ROD further describes that groundwater remediation would be implemented in phases with Phase B covering Hot Spot Containment and/or Removal and Treatability Studies, and Phase C covering Dissolved Phase Groundwater Treatment with Continuation of Hot Spot Containment and/or Removal. For the portion of the contaminated plume with concentrations from 5 to 25 µg/L, the ROD states that remediation will be accomplished by natural attenuation. Results of further modeling, treatability study initial evaluations, and hydrogeologic testing have provided the following new information:

- Plume Area Definition - Initial groundwater modeling results indicate that containment or removal/treatment of the hot spot (defined in the ROD as the greater than 5,000 μg/L portion of the plume) is necessary to achieve restoration within the established time frame of 100 years. Recent refinement of this modeling suggests that containment or removal/treatment of a smaller hot spot (defined as that portion of the plume with TCE concentrations greater than 20,000 μg/L) will facilitate restoration within the established time frame of 100 years.

- Natural Attenuation - The ROD identified monitored natural attenuation as an effective technology for remediation of the less than 25 μg/L TCE plume. Treatability study initial evaluations and the refined modeling suggest that natural attenuation may also be effective for treatment of the 25 μg/L to 1,000 μg/L TCE plume and may be a component of the overall treatment strategy for the 1,000 to 20,000 μg/L dissolved phase TCE plume.

- Dissolved Phase Implementation - Although remediation of the dissolved phase plume is not identified in the ROD as starting until Phase B treatability studies are completed, modeling suggests that early implementation of capture and treatment of the 1,000 to 20,000 μg/L dissolved phase TCE plume will further enhance the remediation of the 25 to 1,000 μg/L TCE plume.

3.2.2 Changes

Based on the new information identified above, the Agencies have determined that the following changes to the selected remedy will be implemented with respect to definition of the areas of the hot spot and dissolved phase plume and the timing of remediation implementation within those areas.

- Plume Area Definition - The new information provides the opportunity to improve the focus of the remediation efforts by refining the ROD Hot Spot and dissolved phase plume definitions as shown in Figure 2. The refined area definitions are:

    * Hot Spot (greater than 20,000 μg/L TCE)

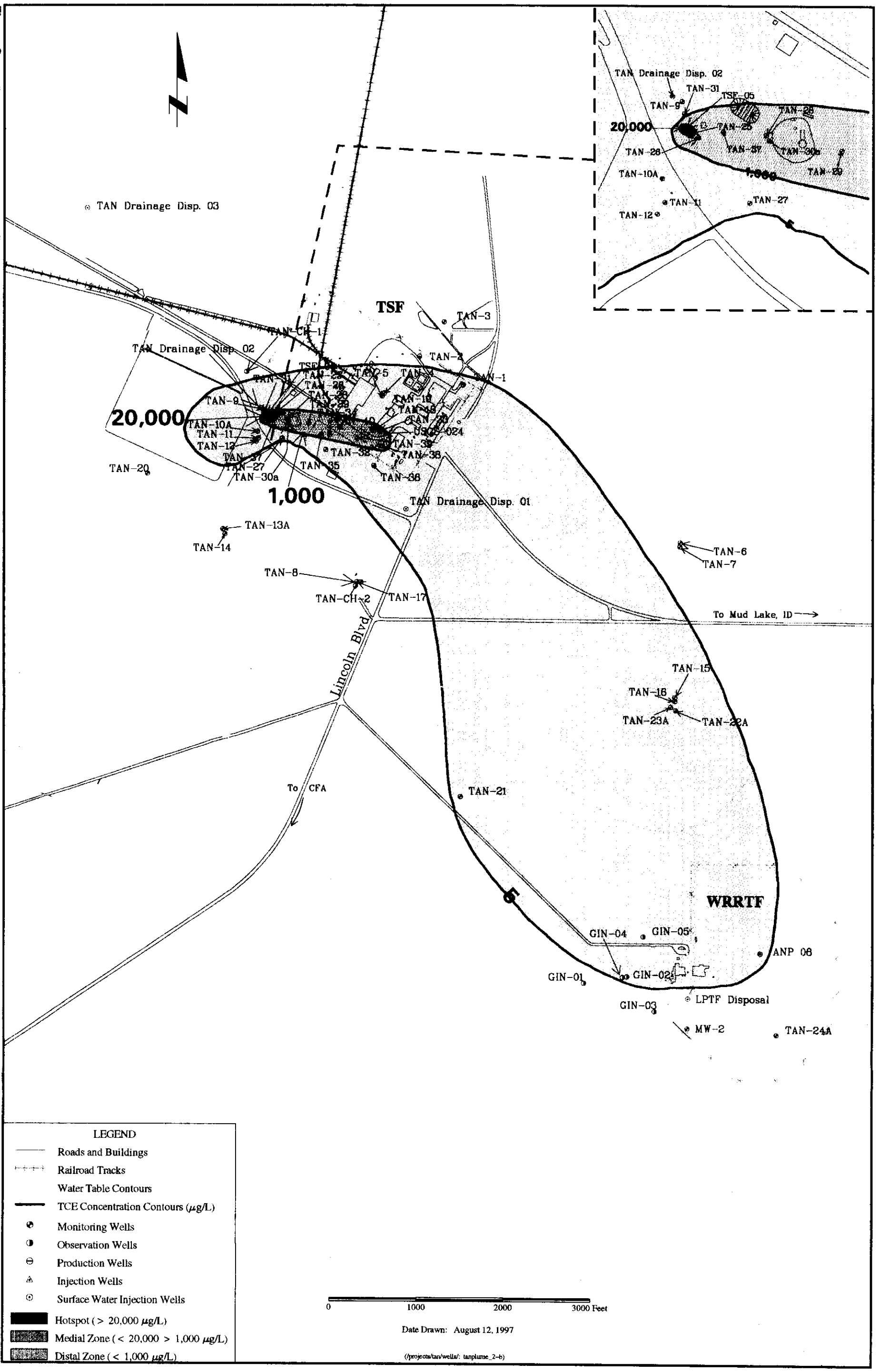
    * Medial Zone (dissolved phase 1,000 to 20,000 μg/L TCE)

    * Distal Zone (dissolved phase 25 to 1,000 μg/L TCE)

- Natural Attenuation - The remedial design and remedial action implementation decision for design, construction, and operation of the default pump and treat system for the distal zone will be further evaluated based on the results of the in situ bioremediation or natural attenuation treatability studies, as applicable.

- Dissolved Phase Implementation - Early extraction and treatment implementation strategy for the medial zone will be to begin design and construction of a new treatment system before the completion of the Phase B studies. The new treatment system will extract and treat the contaminated groundwater in the medial zone and reinject the treated water. Extraction wells will be located approximately 2,000 feet downgradient from the TSF-05 Injection Well near the 1,000 μg/L TCE isopleth. The new medial zone dissolved phase treatment facility will operate at less than 500 gallons per minute. Based on monitoring data collected at the new extraction locations, influent TCE concentrations are expected to be below 1,000 μg/L. Specific design criteria will be determined based on analysis of hydrogeological data obtained at the locations of the new extraction wells. Influent radionuclide

Figure 2. Iso-concentration map for TCE, which defines boundaries for the Hot Spot, Medial Zone, and Distal Zone.



concentrations are anticipated to be below MCLs. Submittal of a Remedial Design/Remedial Action Work Plan for this new treatment system in the medial zone will satisfy the new enforceable deadline of April 30, 1999 established in the March 1997 Dispute Resolution Agreement.

With the changes described above, containment or removal/restoration will remain the remedial action objective for the hot spot. Natural attenuation will be further studied as a potential remedy for the distal zone. The decision to implement further dissolved phase treatment measures in the distal zone will follow the completion of treatability studies. Containment or removal/restoration of the hot spot (greater than 20,000 µg/L TCE) combined with extraction and treatment of groundwater in the medial zone (1,000 to 20,000 µg/L TCE) and further natural attenuation treatability studies for the medial and distal zone (25 to 1,000 µg/L TCE) will support the OU 1-07B remedial action objectives established in the ROD. Groundwater monitoring will continue during the remediation time frame to assess whether the remedial action is meeting modeling assumptions. The overall remediation time frame of 100 years remains appropriate for the expected use of the aquifer underlying Test Area North.

3.3 Treatability Study Approach and Schedule

This section provides new information and changes associated with the treatability study approach and schedule.

3.3.1 New Information

Treatability studies have been initiated as described in the ROD for the five new and innovative technologies. However, the results of planning and initial evaluations have provided the following significant information:

- Treatability Study Evaluation Process - The ROD outlines a standard two-stage CERCLA treatability study approach with bench-scale evaluations and pilot-scale testing. Scoping and planning of treatability study activities for the five technologies, leading to preparation of a Technology Evaluation Work Plan, determined the need for a more refined approach that added an initial evaluation stage before the bench-scale stage.

- Treatability Study Schedule - The 3-year time frame indicated in the ROD for performing treatability studies assumed that bench and pilot studies could be conducted for each of the five technologies concurrently. From the results of treatability study initial evaluations and subsequent planning, the Agencies have determined that a concurrent approach for field implementation of treatability studies in the hot spot (greater than 20,000 µg/L TCE) is not feasible and that a sequential approach will be necessary, resulting in a longer time period to complete the planned studies.

- Alternate Technology Selection - Following the treatability study evaluation process noted above, initial evaluations have been completed for each of the five alternative technologies identified in the ROD.

- Hot Spot - Treatability study initial evaluations indicate that in situ bioremediation or in situ chemical oxidation may be effective for hot spot restoration and that operation of a recirculation cell for either technology at the hot spot may decrease or eliminate the need for continuous pump and treat operations to maintain hydraulic containment of the hot spot.

- Reactive Zone - While initial evaluation results indicate that further evaluation of hot spot restoration by in situ bioremediation or in situ chemical oxidation would require a sequential approach, concurrent field evaluations of in situ bioremediation in the hot spot and in situ chemical oxidation in a zone downgradient and outside of the hot spot has been identified as a possible containment strategy for the hot spot.

- Medial Zone - The in situ bioremediation initial evaluation also showed that a combined anaerobic/aerobic restoration process would provide additional VOC degradation via an aerobic recirculation cell located in the medial zone.

3.3.2 Changes

Based on the new information identified above, the Agencies have determined that the following changes to the selected remedy are needed for conducting the laboratory and field treatability studies for the five technologies identified in the ROD.

- Treatability Study Evaluation Process - Treatability studies will continue by following a modified CERCLA treatability study approach that will provide data and information to determine if a technology is more effective than the pump and treat remedy selected in the ROD. The modified approach identifies three stages for conducting each of the five treatability studies: (1) Initial Evaluations, (2) Laboratory Investigations, and (3) Field Evaluations. The process includes decision points for the Agencies at each stage. As this process progresses, fact sheets will be issued to keep interested parties informed whenever any significant results are obtained and decisions are made. This modified approach is included in a Technology Evaluation Work Plan that includes the results of the initial evaluations and provides subsequent planning for laboratory (bench) investigations and field (pilot) evaluations, as appropriate for each of the five technologies.

- Treatability Study Schedule - The duration for conducting the treatability studies will be extended to approximately 5 years from the date of ROD signature in order to facilitate a sequential approach for bioremediation and in situ chemical oxidation field evaluations in the hot spot (greater than 20,000 μg/L TCE). If bioremediation does not prove to be effective (in terms of restoration time frame or cost) for restoration of the hot spot, the in situ chemical oxidation field evaluation will then be implemented in the hot spot. With this change in duration, the results of the treatability study field evaluations will be provided in two reports. The first report, Phase I Field Demonstration Report, will document the success or failure of in situ bioremediation in the hot spot and in situ chemical oxidation in the reactive zone. If in situ bioremediation in the hot spot fails, the Agencies will decide whether or not to proceed with in situ chemical oxidation in the hot spot based on the information provided in the Field Demonstration Report. Submittal of the Phase I Field Demonstration Report will satisfy the new treatability study report enforceable deadline of October 31, 1999 established in the March 1997 Dispute Resolution Agreement. The second report, Phase II Field Demonstration Report, will document the success or failure of in situ chemical oxidation in the hot spot. Results of the field evaluation for natural attenuation will also be addressed in the phase I and phase II reports.

- Alternate Technology Selection - Treatability study initial evaluations for in situ bioremediation and in situ chemical oxidation indicate that both have the potential for restoration of the hot spot in a shorter time frame than the default pump and treat technology and that natural attenuation has the potential for restoration of the distal zone within the restoration time frame. Implementation of in situ bioremediation and in situ chemical oxidation field evaluation activities will follow appropriate

laboratory investigations. The natural attenuation field evaluation will be based on data collected during routine plume monitoring and will not include laboratory investigations.

- Hot Spot - Treatability studies for in situ bioremediation will focus on hot spot restoration and will be planned to include laboratory investigations to characterize indigenous microcosms, hydrogeological investigations to characterize aquifer properties in the vicinity of the hot spot, and a field evaluation of a nutrient amended recirculation cell within the anaerobic zone surrounding the hot spot. The anaerobic in situ bioremediation recirculation cell will be planned to operate without interference from, and concurrent with, the in situ chemical oxidation reactive zone described below.

- Reactive Zone - Treatability studies for in situ chemical oxidation will be planned to include a field evaluation at a location within approximately 500 feet downgradient from the TSF-05 Injection Well. This field evaluation will be planned for concurrent implementation with the anaerobic in situ bioremediation hot spot field evaluation and will be designed to create a chemically reactive zone that may contain the hot spot. Before implementing in situ chemical oxidation field evaluation activities, laboratory investigations will be performed to determine and confirm objectives and optimal location of the reactive zone field evaluation. If the anaerobic in situ bioremediation hot spot field evaluation indicates that bioremediation is not a viable treatment technology for hot spot restoration, then an in situ chemical oxidation field evaluation will be implemented in the hot spot.

- Medial Zone - The medial zone (1,000 to 20,000 µg/L TCE) aerobic recirculation cell concept will only be evaluated as a component of the in situ bioremediation laboratory studies and through data collected during routine plume monitoring. In the event that a field evaluation of in situ chemical oxidation shows that it is not cost-effective or long-term implementation exceeds the ROD-defined restoration time frame, and if anaerobic in situ bioremediation in the hot spot is effective (in terms of restoration time frame or cost), then a medial zone aerobic recirculation cell may be further evaluated as a component of a new medial zone treatment facility that would support a combined anaerobic/aerobic treatment system.

3.4 Waste Management Requirements and Area of Contamination Definition

This section identifies new information and changes/clarifications associated with waste management requirements and area of contamination definition.

3.4.1 New Information

Waste generated from the remedial action activities has been managed as RCRA characteristic. The area of contamination with respect to remediation has been considered to be the groundwater contaminated plume greater than 500 µg/L TCE, i.e., the GWTF and ancillary storage units. However, the following issues have developed with respect to RCRA hazardous waste classification and the area of contamination (AOC) definition for waste management purposes:

- Hazardous Waste Classification - The OU 1-07B ROD includes an action-specific applicable or relevant and appropriate requirement (ARAR) for treatment process systems for extracted groundwater and sludge (State of Idaho Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, IDAPA 16.01.05.008, Closure Performance, [40 CFR 264.111], and Disposal or Decontamination, [40 CFR 264.114]). In citing this ARAR, the ROD indicates that the

standards are relevant and appropriate because it had been determined that the contaminated plume does not contain RCRA-listed waste and that the standards were applicable for the storage facility involving RCRA characteristic waste from the treatment of the extracted groundwater and sludge. In April 1997, a determination was made that listed solvents were disposed of at the TAN facility via the TSF-21 Valve Pit. Because the TSF-21 Valve Pit was interconnected with the TSF-05 Injection Well, the injection well and associated groundwater contamination plume are considered to contain listed waste as well. The RCRA-listed waste classification, waste code F001, is therefore applicable to the contaminated TAN groundwater and associated waste streams, and the substantive requirements of the above cited ARARs are applicable for the RCRA listed waste.

- AOC and CERCLA Site - Area designations for the purpose of waste management are not fully covered in the ROD.

3.4.2 Changes and Clarifications

Based on the issues identified above, the Agencies have determined that the following changes and clarifications to the selected remedy are needed for waste management requirements and AOC definition.

- Hazardous Waste Classification - Because the TSF-05 Injection Well received the same waste streams as contained in the TSF-21 Valve Pit, the DOE has determined that all contaminated groundwater at TAN and the associated wastes generated from the groundwater remediation activities will also be subject to classification as a RCRA-listed waste (waste code F001).

- AOC and CERCLA Site - The AOC for waste management purposes will be defined as the area overlaying and within the contaminated groundwater plume (i.e., detectable TCE concentrations greater than 5 μg/L). This AOC definition allows for necessary remediation activities to be performed at prescribed locations within the AOC, but will not result in management of wastes outside of established temporary accumulation areas. Any future temporary accumulation areas will be established within the AOC immediately adjacent to the existing or future treatment facilities only to the extent necessary for proper and efficient management of waste streams. The CERCLA site for waste management purposes, as defined in the FFA/CO, is the entire INEEL site area, which includes the Waste Reduction Operations Complex (WROC), the Radioactive Waste Management Complex (RWMC), and the Mixed Waste Treatment Facility (MWTF). Waste generated during remedial action will be managed within the AOC, or stored at WROC, RWMC, and MWTF, or transported offsite. Waste generated during remediation activities and stored in a temporary accumulation area within the AOC will be moved to one or more of the waste management areas within the INEEL site or sent offsite for storage, treatment, and/or disposal.

4. AFFIRMATION OF THE STATUTORY DETERMINATION

Considering the new information that has been developed, DOE, EPA, and IDHW believe that the remedy, as modified, remains protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate (ARAR) to this remedial action, and is cost-effective. However, the following clarifications will be used in performing the remedial action:

- Chemical-specific ARARs for reinjection of treated groundwater above MCLs (Safe Drinking Water Act, Underground Injection Control Program, Idaho Rules and Regulations for the Construction and Use of Injection Wells, IDAPA 37.03.03, and Section 3020 of RCRA) are identified in the ROD. As provided for under Section 3020 of RCRA, reinjection of treated water above MCLs for both VOCs and radionuclides will occur during the approximate 5-year period for conducting Phase B treatability studies. Reinjection of treated water from the GWTF will be limited to the area inside the hot spot or the area between the hot spot and a location 2,000 feet downgradient of TSF-05. Treated water from the GWTF will include both VOCs and radionuclides that are above MCLs. The concentration for contaminants in the reinjected water will always be below the concentration of the receiving water at the point of reinjection, unless agency concurrence is reached to do otherwise under site-specific conditions. As identified in Section 3.1, treatment for radionuclides has been determined to be cost prohibitive. Also, during other short-term activities such as well pump tests, water may be reinjected into the contaminated portion of the plume above MCLs for VOCs, but at a concentration less than the receiving water at the point of reinjection.

- The ROD includes the State of Idaho Secondary Drinking Water Standards (IDAPA 16.01.08.400.03) as a Chemical-Specific ARAR. These standards establish primary and secondary MCLs. Secondary MCLs are a consideration for in situ chemical oxidation and in situ bioremediation treatability studies because the field evaluation activities will involve the injection of treatment agents, i.e., oxidants and nutrients. Also, oxidation of TCE by potassium permanganate will yield manganese dioxide as a by-product, which may initially exceed the secondary MCL of 0.05 mg/L for total manganese. Secondary MCLs are also a consideration for bioremediation treatability studies where the addition of nutrients or other amendments may also initially exceed established secondary MCLs. However, Secondary MCLs were developed as aesthetic guidelines for the public acceptance of drinking water, and are not federally enforceable. Secondary MCLs are enforced for all groundwater uses by the State of Idaho through the Groundwater Quality Rule (IDAPA 1601.11.200) adopted by IDHW in March 1997. However, the Groundwater Quality Rule also states that site-specific groundwater quality levels may vary from enforceable standards, based on consideration of effects to human health and the environment, for remediation conducted under state oversight (IDAPA 16.01.11.400.05). Enforceable groundwater quality standards must be achieved at the completion of the restoration time frame, which is specified as year 2095. The pilot-scale study will not result in exceedences at the completion of the restoration time frame. Therefore, although concentrations of manganese or other treatment agents in or near the hot spot or reactive zone may exceed the secondary MCLs as a result of treatability study implementation, this excursion is acceptable because the hot spot and medial zones are not currently drinking water sources due to the high concentrations of contaminants of concern that are present. In situ chemical oxidation and in situ bioremediation are being evaluated for implementation to remove TCE in an attempt to restore the aquifer to drinking water quality within 100 years. Therefore, it is not appropriate to apply secondary MCLs before the end of the restoration period. Institutional controls are part of the remedial action and will be protective of human health and the environment during the restoration time frame.

The revised remedy continues to use permanent solutions and consider alternate innovative treatment technologies to the extent practicable. The evaluation of alternative or innovative technologies will be conducted with a preference for treatment as a principal element of remediation.

5. PUBLIC PARTICIPATION ACTIVITIES

This ESD has been published and a notice placed in the Post Register (Idaho Falls), Idaho State Journal (Pocatello), Sho-Ban News (Fort Hall), Times News (Twin Falls), Idaho Statesman (Boise), and Daily News (Moscow). This ESD and the contents of the Administrative Record are available for public review (refer to binder for Operable Unit 1-07B). As modified from the original ROD, this action does not represent a fundamental change in scope or purpose; therefore, a formal comment period will not be conducted.

Consistent with NCP Section 300.435(c)(2)(i), this ESD has been placed into the previously listed INEEL Information Repositories, after publication in the following papers:

> Post Register (Idaho Falls), Idaho State Journal (Pocatello), Sho-Ban News (Fort Hall), Idaho Statesman (Boise), and Daily News (Moscow) .

The public is encouraged to review this ESD and other relevant documentation in the Administrative Record and provide comments to any of the Agencies involved. Additional information may be requested within 14 days of the notice of issuance for this ESD by contacting:

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